

EXHIBIT-I
AGREEMENT

IN THE UNITED STATES PATENT OFFICE

Group Art Unit : 237
Examiner : Mark E. Nusbaum
Applicants : Lee et al
Serial No. : 815,333
Docket No. : 142
Filing Date : July 13, 1977
For : INTERACTIVE CONTROL SYSTEM

REQUEST TO TAKE NOTICE OF "ON-SALE" ISSUE

COMMISSIONER OF PATENTS

Washington, D.C. 20231

Sir:

5 This is a request to take notice of an on-sale issue being raised in the instant application. Applicant submits that this on-sale issue is without proper basis and therefore should not affect the issuance of the instant application. Nevertheless, it is the desire of applicant to make of-record pertinent considerations, which are set forth herein.

10 I. BACKGROUND

During 1968 and the first half of 1969, Applicant Hyatt pursued development of computerized equipment; particularly for the automation of machine tools and also for other machines and devices. Hyatt formed Micro Computer Inc to pursue such
15 developments. About May and June of 1969, negotiations between Micro Computer Inc and DS America resulted in an agreement dated June 30, 1969 for Micro Computer Inc to develop a photo-plotter system for DS America. A copy of that agreement is attached hereto as Exhibit-I. This agreement set forth the
20 functional requirements for an operator panel (Exhibit-I attached hereto).

Salient features of the on-sale issue are set forth in the DECLARATION OF GILBERT P. HYATT attached hereto as Exhibit-II. This Declaration clearly shows that the panel invention was
25 not on-sale more than one year prior to the effective filing date of the instant application.

II PATENT LITIGATION

5 In November 1979, Mattel Inc filed a Declaratory Judgement
suit against Hyatt (Mattel v. Hyatt, civil action No. 78-4233-R,
United States District Court, Central District of California)
10 seeking invalidity of parent patent No. 4,038,640. Mattel
moved for Summary Judgement for invalidity based upon the panel
invention being on-sale, but Summary Judgement was not granted.
Copies of the pleadings are set forth in Exhibits III to VI
herein. From these pleadings, it is clear that the panel
15 invention was not on-sale more then one year prior to the
effective filing date. Nevertheless, the Final Judgement found
invalidity for being on-sale (Exhibit VII herein). This
decision is presently being appealed.

III PANEL INVENTION WAS NOT ON-SALE

15 It is clearly established that the panel invention was not
on-sale more then one year prior to the effective filing date.
Exemplary considerations are set forth below.

(a) The panel invention could not have been placed on-sale
with said agreement (Exhibit I herein) because it was
20 not invented until after said agreement was signed.

(b) The panel invention could not have been invented until
after said agreement was signed because at least one
of the co-inventors had not met the rest of the co-
inventors until after said agreement was signed.

25 (c) The panel invention could not have been on-sale more
then one year prior to the effective filing date because
acceptance by DS America was not given until December 29, 1969
deliveries were not made until 1970; development continued
into 1970; all being less then one year prior to the
30 December 28, 1970 effective filing date.

Therefore, the on-sale issue is without proper basis and should not affect the issuance of the instant application.

Respectfully submitted,

Gilbert P. Hyatt, Applicant
Patent Agent Reg. No. 27,647
P.O. Box 4584
Anaheim, California 92803
Phone (714) 533-2936

Date

EXHIBIT-A

REQUEST TO TAKE NOTICE OF "ON-SALE" ISSUE

Related application S/N 815,333

Filed about February 25, 1980

Including Exhibits I and II attached thereto

IN THE UNITED STATES PATENT OFFICE

Group Art Unit : 211
Examiner : Richard A. Wintercorn
Applicant : Gilbert P. Hyatt
Serial No. : 950,901
Docket No. : 164
Filing Date : Oct 12, 1978
For : HIGH REGISTRATION PHOTOMASK MACHINE AND
COMPUTERIZED NUMERICAL CONTROL SYSTEM

AMENDMENT ON FORMAL MATTERS UNDER RULE 312

COMMISSIONER OF PATENTS

Washington, D.C. 20231

Sir:

5 This is an amendment on formal matters, submitted in
compliance with the requirements of the Patent Office. In
particular, this amendment does not introduce new matter, does
not require further search, and does not affect the claims;
as discussed under REMARKS hereinafter. Therefore, Applicant
10 respectfully submits that this amendment should be entered as
proposed.

 Further, this amendment is "filed not later than the
date the issue fee is paid" (Rule 312), wherein the issue fee
has not as yet been paid.

15 Still further, the instant amendment had not been earlier
presented because of the Patent Office request that "it would
be appreciated if the filing of additional papers relating to
an allowed application were deferred until a notice of allowance
(POL-85) is received" (MPEP 502, page 32, column 1, lines 34-37).

20 In view of the above, please enter the amendments proposed
herein.

I AMENDMENTS1.1 IN THE SPECIFICATION

Page 1 at lines 1 and 2, change the title to read

--MICROCOMPUTER BASED PHOTOGRAPHIC SYSTEM--.

Page 1, cancel lines 3-14 and substitute in place thereof
5 the following abstract.

--ABSTRACT OF THE DISCLOSURE

B1
A photographic system and a microcomputer based control
system are provided for providing photographic exposures.
An illumination control system for generating high registration
10 photomasks is provided. A control system implemented with a
monolithic microcomputer controls a photographic device
through a minimal interface for high capability and economy.--.

Page 1B, cancel lines 16-21 and substitute in place
thereof the following.

15 A-6. MACHINE CONTROL SYSTEM OPERATING FROM REMOTE COMMANDS
Serial No. 230,872 filed on March 1, 1972;

B2
7. COORDINATE RESOLUTION FOR NUMERICAL CONTROL SYSTEMS
Serial No. 232,459 filed on March 7, 1972 and issuing sub-
stantially coterminously herewith; ✓

20 Page 1B at line 24, after "on April 24, 1972" and before
the semicolon insert ✓ and issuing substantially coter-
minously herewith. ✓

B3
Page 1C at line 13, after "on Oct 1, 1973" and before
the semicolon insert ✓ and issuing substantially coterminously
herewith. ✓

B4
Page 1C, cancel lines 14 and 15 and substitute in place
thereof the following.

B5
A-18. COMPUTERIZED MACHINE CONTROL SYSTEM Serial No. 476,743
filed on June 5, 1974 and issuing substantially coterminously
30 herewith. ✓

Page 1D after line 18, insert the following paragraph.

⁵ *Be* ~~4~~In order to facilitate incorporation by reference; the files of said applications Serial No. 101,881; Serial No. 134,958; Serial No. 135,040; Serial No. 230,872; Serial No. 232,459; Serial No. 246,867; Serial No. 291,394; and Serial No. 302,771 are hereby opened to the public for the limited purpose of obtaining a copy of the disclosure as-filed but not for obtaining copies of other papers therein. ~~4~~.

10 Page 1D following the above amendment to page 1D after line 18, insert the following paragraph.

B7 ~~4~~Copies of said patents No. 3,738,242; No. 3,820,894; No. 4,060,848; No. 3,986,022; No. 4,120,583; No. 4,121,284; No. 4,034,276; No. 4,038,640; and No. 3,897,753 have been incorporated into the file wrapper of the instant application for convenience of researching the material that is incorporated by reference. ~~4~~.

Page 2, cancel lines 4 and 5 and substitute in place thereof --and in particular an illumination control system.--.

Page 2, cancel lines 7-28 ^{and} insert the following paragraph.

B8 ~~4~~Prior art photographic systems have been controlled mechanically, electronically, and in other forms. Computers have been available in the form of core memory based computers. The use of a monolithic computer to control a photographic system is not provided in the prior art. ~~4~~.

25 Cancel pages 3-6 and substitute in place thereof the following.

~~A~~ SUMMARY OF THE INVENTION

36 *B9* The present invention is directed to a monolithic computer-based photographic system and a high registration camera system. A detailed summary of the high registration camera system embodiment is set forth in parent application Serial No. 752,751 at pages 3 to 6 and in Patent No. 4,120,583 issuing thereon at column 2 line 31 to column 4 line 34; which is herein incorporated by reference. ~~4~~.

Cancel page 7 lines 1-17 and substitute in place thereof the following paragraphs.

⁵ B10 ~~AA~~An object of this invention is to provide an improved computerized machine control system.

A further object of this invention is to provide a monolithic computer for machine control.

A still further object of this invention is to provide a system with reduced interface circuits. ~~h~~.

Page 9, after line 19; insert the following paragraph.

¹⁰ B11 ~~h~~The figures are discussed in detail in the material that is incorporated by reference from related application Serial No. 752,751 now Patent No. 4,120,583. ~~h~~.

Page 10 at line 2, change "contact print" to --photographic--.

¹⁵ Page 10 at line 3, change " a preferred" to --An illustrative--.

Page 10 at line 5, after "principals of" delete "the".

²⁰ B12 Page 10, cancel lines 5-7 and substitute in place thereof --in the parent patent applications. For example, parent application Serial No. 101,881 discloses a photoplotter illumination control system and parent application Serial No. 366,714 now Patent No. 3,986,022 discloses a photographic camera system and a liquid crystal shutter and aperture arrangement.--.

Cancel page 10 line 8 to page 42 line 21 and substitute in place thereof the following paragraph.

²⁵ B13 ~~h~~A contact print photo-optical embodiment is disclosed in related application Serial No. 752,751 at page 10 line 8 to page 42 line 21 (now Patent No. 4,120,583 at column 5 line 64 to column 21 line 23); which disclosure is herein incorporated by reference. ~~h~~.

³⁰ Cancel page 43 line 2 to page 56 line 31 and substitute in place thereof the following paragraph.

³⁵ B14 ~~h~~A numerical control system embodiment is disclosed in related application Serial No. 752,751 at page 43 line 2 to page 56 line 31 (now Patent No. 4,120,583 at column 21 line 26 to column 28 line 13); which disclosure is herein incorporated by reference. ~~h~~.

Cancel page 59 line 6 to page 72 line 17 and substitute in place thereof the following paragraph.

5 B15
--System implementation and operation is disclosed in related application Serial No. 752,751 at page 59 line 6 to page 72 line 17 (now Patent No. 4,120,583 at column 29 line 20 to column 35 line 52); which disclosure is herein incorporated by reference.--.

Page 73 inbetween lines 12 and 13, insert the following paragraph.

10 B16
--The data processor of the present invention is discussed in detail herein; is discussed in further detail in the material that is incorporated by reference from parent application Serial No. 246,867 issuing contemporaneously with the instant application; is discussed in still further detail in the material that is incorporated by reference from parent application Serial No. 232,459 issuing contemporaneously with the instant application; and is discussed in further detail in the material that is incorporated by reference from parent application Serial No. 101,881 copending with the instant application.--.

20 Cancel page 74 line 4 to page 80 line 33 and substitute in place thereof the following paragraph.

B17
25 ~~The~~ The data processor is disclosed in related application Serial No. 752,751 at page 74 line 4 to page 80 line 33 (now Patent No. 4,120,583 at column 36 line 26 to column 39 line 47); which disclosure is herein incorporated by reference.--.

Cancel page 81 line 2 to page 107 line 13 and substitute in place thereof the following paragraph.

B18
30 ~~The~~ The operator panel is disclosed in related application Serial No. 752,751 at page 81 line 2 to page 107 line 13 (now Patent No. 4,120,583 at column 39 line 50 to column 53 line 7); which disclosure is herein incorporated by reference.--.

Page 107 after line 13; insert the following paragraph.

B19
35 --The operator panel is further discussed in detail in the material that is herein incorporated by reference from Patent No. 4,121,284 and Patent No. 4,038,640.--.

Cancel page 108 line 2 to page 143 line 6 and substitute in place thereof the following paragraph.

5
B20
10
--Various machine control capabilities including operator panel; tape control; feedrate control; motion resolution, conversion and scaling; dimensioning; tool offsets; tabular memory control; acceleration and deceleration control and rotary axis capabilities are disclosed in related application Serial No. 752,751 at page 108 line 2 to page 143 line 6 (now Patent No. 4,120,583 at column 58 line 10 to column 73 line 18); which disclosure is herein incorporated by reference.--.

Cancel page 144 line 2 to page 160 line 6 and substitute in place thereof the following paragraph.

15
B21
--A CNC command arrangement is disclosed in related application Serial No. 752,751 at page 144 line 2 to page 160 line 6 (now Patent No. 4,120,583 at column 73 line 21 to column 81 line 34); which disclosure is herein incorporated by reference.--.

20
Cancel page 161 line 2 to page 170 line 28 and substitute in place thereof the following paragraph.

25
B22
--A machine interface arrangement is disclosed in related application Serial No. 752,751 at page 161 line 2 to page 170 line 28 (now Patent No. 4,120,583 at column 81 line 37 to column 85 line 68); which disclosure is herein incorporated by reference.--.

Cancel page 171 line 2 to page 177 line 9 and substitute in place thereof the following paragraph.

30
B23
--Switch control operations are disclosed in related application Serial No. 752,751 at page 171 line 2 to page 177 line 9 (now Patent No. 4,120,583 at column 86 line 3 to column 89 line 23); which disclosure is herein incorporated by reference.--.

Page 177 after line 20, insert the following paragraph.

B24
--Switch signal processing is described in detail in parent application Serial No. 288,247 now Patent No. 4,121,284; particularly relative to Fig 6 therein.--.

5 Cancel page 178 line 2 to page 195 line 5 and substitute in place thereof the following paragraph.

B25
10 --Machine interface operations are disclosed in related application Serial No. 752,751 at page 178 line 2 to page 195 line 5 (now Patent No. 4,120,583 at column 89 line 40 to column 98 line 2); which disclosure is herein incorporated by reference.--.

Page 208 at line 6, after "reference." insert --In particular, a detailed description of a servo control arrangement in accordance with the system of the present invention is set forth in said parent application Serial No. 135,040 and a servo command structure in accordance with the present invention is set forth in said parent applications Serial No. 134,958 and Serial No. 246,867. Said parent application Serial No. 246,867 is issuing contemporaneously with the instant application.
15
20 Said parent application Serial No. 135,040 was refiled as application Serial No. 339,817 now Patent No. 4,034,276.--.

Cancel page 208 line 24 to page 212 line 11 and substitute in place thereof the following paragraph.

B27
25 --A servo arrangement is discussed in related application Serial No. 752,751 at page 208 line 24 to page 212 line 11 (now Patent No. 4,120,583 at column 104 line 51 to column 106 line 58); which disclosure is herein incorporated by reference.--.

II REMARKS

2.1 AMENDMENTS TO THE SPECIFICATION

Amendments have herein been proposed to the specification, which do not introduce new matter; as discussed below.

Amendments have been made to the title, abstract, background, and summary to clarify the claimed invention including the integrated circuit processor-based high registration photographic system of claims 1 and 2 and the monolithic processor-based illumination control system of claims 3-10.

Various amendments hereto are substantially identical to amendments proposed in parent applications S/N 476,743 or 752,751; which applications have been incorporated by reference into the instant application as-filed. These substantially identical amendments include the amendments proposed herein to page 1D after line 18; page 7 lines 1-17; page 10 line 9 to page 42 line 21; page 43 line 2 to page 56 line 31; page 73 inbetween lines 12 and 13; page 107 after line 13; page 108 line 2 to page 143 line 6; page 144 line 2 to page 160 line 6; page 171 line 2 to page 177 line 9; page 177 after line 20; and page 208 at line 6.

The amendments to the list of related applications at pages 1B and 1C have been made to correct the identification thereof such as status and title changes.

Material that has been incorporated by reference into the instant application as-filed from parent application Serial No. 752,751 has been cancelled herein and referencing statements inserted in place thereof to reduce unnecessary printing efforts for the PTO and expenses to Applicant. A declaration on incorporation by reference is transmitted herewith.

Various other amendments are proposed that clearly do not introduce new matter.

2.2 PARENT AND RELATED PATENTS

Certain parent and related patents that are incorporated by reference into the instant application as-filed are transmitted herewith for incorporation into the file wrapper of the instant application for convenience of researching this material.

2.3 REQUEST TO TAKE NOTICE

Applicant respectfully requests that the Examiner take notice of a typographical error. In particular, in the Amendment filed on Oct 1, 1979 at page 1; the amendment proposed to page 1B at line 6 should be entered to page 1B at line 26.

2.4 ON-SALE ISSUE

Applicant respectfully requests that the Examiner take notice of an on-sale issue. Applicant submits that this on-sale issue should not affect the issuance of the instant application.

In *Mattel v. Hyatt*, civil action No. 78-4233-R, United States District Court, Central District of California; related patent No. 4,038,640 was found to be invalid for being on-sale under 35 USC 102(b). This judgement is now under appeal.

The on-sale issue has been discussed in related application S/N 815,333 in a paper filed about February 25, 1980 entitled Request To Take Notice Of "On-Sale" Issue; which is herein incorporated by reference. Included therewith as exhibits are the pertinent pleadings and Findings of Fact And Conclusions Of Law in said civil action. Said paper and Exhibits I and II included therewith are attached hereto as Exhibit-A. Exhibits III to VII included therewith may be obtained from the file wrapper of said related application.


Applicant submits that the invention claimed in the instant application was not on-sale more than one year prior to the effective filing date thereof.

Applicant respectfully requests that the Examiner consider said Request To Take Notice Of "On-Sale" Issue in said related application.

III SUMMARY

It is respectfully submitted that the present application meets the requirements of the Statutes, the Rules of Practice, and the Manual of Patent Examining Procedure and that all claims are patentably distinct over the prior art. Therefore, this application is now in condition for allowance. Such action is respectfully requested.

Respectfully submitted,


Gilbert P. Hyatt
Patent Agent Reg.No. 27,647
P.O.Box 4584
Anaheim, California 92803
Phone: (714) 533-2936

2/25/80
Date

DECLARATION OF GILBERT P. HYATT

I, GILBERT P. HYATT, do hereby declare, under penalty of perjury, as follows:

1. I am a Defendant in the captioned litigation.

2. During the month of June, 1969, I was the President of Micro Computer, Inc. (herein referred to as "MI").

3. During the month of June, 1969, I negotiated a contract for development of a photoplotter control system on behalf of MI.

4. On or about June 30, 1969, I signed an agreement (herein referred to as the "Agreement") with D. S. America to develop a prototype controller system and, if accepted by D. S. America, to sell production units to D. S. America.

5. On June 30, 1969, when the Agreement was signed, the inventions set forth in Patent No. 4,038,640 (herein referred to as the "panel patent") had not as yet been invented.

6. The Agreement with D. S. America contemplated an Operator Panel, but the Operator Panel required only such features that could be provided with conventional prior art methods and did not specify the inventions claimed in the panel patent.

1 7. During the development of the prototype controller
2 system from about August, 1969, through about November, 1969,
3 the panel features claimed in the panel patent were invented.
4

5 8. During the period of about October, 1969 through
6 December 31, 1969, and into the beginning of 1970, the panel
7 incorporating the features claimed in the panel patent was a
8 prototype panel and was only used with the prototype controller
9 system.
10

11 9. During 1969, the prototype panel was only demonstrated
12 on a limited and confidential basis.
13

14 10. On December 29, 1969, Sigurd Frohlick of D. S. America
15 signed a document accepting the prototype controller system.
16 Not a single production controller system was built or operating
17 during 1969.
18

19 11. MI did not receive any payment under the Agreement
20 from D. S. America until January, 197⁹, after the prototype
21 controller system had been accepted by D. S. America.
22

23 12. Acceptable Contourama IV operation was never demon-
24 strated in 1969, where Sigurd Frohlic of D. S. America wrote in
25 a letter dated January 8, 1970 (inspected and copied by Plain-
26 tiff): "Today, January 8th, you still have not shown us any
27 demonstration of value, with your system December 24th
28 you invited Mr. Funaki and myself for a demonstration; again

1 the facts are that there was no demonstration. I have signed
2 the acceptance of the unit, since I have confidence in your
3 engineer, Mr. Hyatt. I know from experience that anything of
4 new manufacture has problems, and I appreciate your position."
5

6 13. Development work continued even after the December
7 29, 1969 acceptance because the system did not meet the D. S.
8 America requirements for a commercial product.
9

10 14. The prototype controller system was not accepted
11 "approximately three (3) months" after June 3, 1969 as contem-
12 plated in the Agreement, but was accepted about six months
13 thereafter on December 29, 1969.
14

15 15. The first production unit was not delivered "four
16 (4) to six (6) months" after June 30, 1969 as contemplated in
17 the Agreement because development work continued into the early
18 part of 1970 at the MI facility.
19

20 16. The characterization of the December 29, 1969 date
21 being "conveniently less than one year prior to the critical
22 date" in Plaintiff's Findings of Fact of its Motion [page 4,
23 lines 4-7] is incorrect. This date was not a convenience, but
24 was an achieved objective. The patent law firm of Fraser and
25 Bogucki advised MI to file the panel patent no later than
26 December 28, 1970, to eliminate any possibility of sales prior
27 to the critical date against the December 29, 1969 acceptance
28 of D. S. America being construed as a sale. Fraser and Bogucki

1 did in fact file the patent on behalf of MI on December 28, 1970.

2
3 17. The characterization of the Contourama IV in Plain-
4 tiff's Findings of Fact of its Motion [page 3, lines 20-26] are
5 untrue. The terms of the Agreement provided for development
6 of a "prototype controller system" which is not a "production
7 system." Modification of the "prototype controller system" to
8 "operate on a commercial basis" was contemplated in the Agree-
9 ment. If such operation were not achieved, D. S. America had
10 the option to terminate the Agreement causing there to be no
11 production systems. In 1969, not one "production system" was
12 built, only a "prototype controller system" was built. In 1969,
13 the Contourama IV was not manufactured by MI, but was a proto-
14 type built by MI's engineering personnel. In 1969, the panel
15 was not manufactured by MI, but was a prototype built by MI's
16 engineering personnel.

17
18 18. The characterization of acceptance in Plaintiff's
19 Findings of Fact of its Motion [page 4, lines 1-7] is untrue.
20 Formal acceptance of "the production system" did not occur on
21 December 29, 1969. Interim acceptance of only a "prototype
22 controller system", not a production system, occurred on Decem-
23 ber 29, 1969. No production or prototype system was delivered
24 in 1969.

25
26 19. The statement of "operational" in Plaintiff's Find-
27 ings of Fact of its Motion [page 4, lines 20-25] is incorrect.
28 Although the portions of the panel invention claimed in the

1 patent were demonstrated before December 28, 1969, the portions
2 of the panel relating to the Contourama IV system, as set forth
3 in the Agreement, were not operating until 1970. The Contourama
4 IV and the panel portion thereof were not operational by the
5 critical date of December 28, 1969, where development and modi-
6 fication of the Contourama IV continued into 1970.
7

8 20. The characterization of "experimental purpose" in
9 Plaintiff's Findings of Fact of its Motion [page 4, lines 8019]
10 is incorrect. The Agreement provides for development of a
11 "prototype", modification of the "prototype" to attempt to
12 achieve operation on a commercial basis, and the right for D. S.
13 America to terminate the Agreement if such operation were not
14 achieved. Production systems were not delivered to the schedule
15 set forth in the Agreement.
16

17 21. The statement of "uncontested facts" in Plaintiff's
18 Findings of Fact of its Motion [page 4, line 26, to page 5, line
19 14] is incorrect. The Agreement signed June 30, 1969, was a
20 conditional agreement requiring successful development and
21 modification of a prototype system that was not then in existence
22 before any production systems would be delivered. The panel
23 invention was not part of said Agreement, and was not even
24 invented until after said Agreement had been signed. The Con-
25 tourama IV features required in said Agreement were not built
26 nor demonstrated in "September or October of 1969," where only
27 the claimed features in said patent which were not part of said
28 Agreement were built and operated in "September or October of

1 1969." No production model of the entire Contourama IV was
2 operating successfully at least by December 25, 1969." No
3 "production model" was built in 1969, only a "prototype con-
4 troller system." Even the "prototype controller system" was
5 not "operating successfully at least by December 25, 1969," but
6 was only operating partially by that date.
7

8 I declare under penalty of perjury that the foregoing
9 is true and correct.
10

11 EXECUTED at Los Angeles, California, this 22nd day of
12 March, 1979.
13

14
15 S/S GILBERT P. HYATT
16 GILBERT P. HYATT
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EXHIBIT -II

DECLARATION OF GILBERT P. HYATT

Ex 11-1

EQUIPMENT PURCHASE AGREEMENT

DS AMERICA, INC. (hereinafter referred to as DS), a California corporation, located at 3501 South Broadway, Los Angeles, and MICROCOMPUTER, INC. (hereinafter referred to as MI), located at 11611 Amigos Ave, Northridge, Calif., on June 21, 1969 agree as follows:

I. TERM, EXCLUSIVITY, ETC.

This contract shall remain in force for a period of five (5) years. During this time period, MI shall not sell controllers for equipment similar or substitutional to the P-25 photo-optical equipment for use in the manufacture of printed circuits or integrated circuits, to competitors of DS and shall sell the same exclusively to DS. DS and its affiliates shall not purchase, sell or manufacture controllers similar to the one being provided by MI. (Affiliates shall include companies which own more than 50% of DS or in which DS owns more than 50%). MI shall be relieved of this exclusivity obligation if and when DS cancels its obligation to purchase additional controllers or does not place orders for controller systems at the minimum rate of three (3) controller systems per successive four (4) month period during the life of the contract. MI shall notify DS two weeks in advance of its election to make this agreement non exclusive if said orders are not placed. DS may cancel their obligation to purchase any controllers after the first ten (10). DS must purchase ten (10) systems as set forth in paragraph V.

II. PRICES

Price of the first controller system shall be \$23,950, payable net on completion of integration and receiving inspection of DS. The second through ^{sixth} ~~ten~~ controllers are priced at \$19,750 each, payable ~~on delivery to DS~~ ^{on delivery to DS with a 30 day letter of credit. The seventh through tenth controllers are priced at \$13,750 each, payable on delivery to DS with a 150 day letter of credit.}

CJPA

Prices specified are for a controller system emulating the G. E. Mark Century 120 and do not include the aperture control since type of aperture has not been specified, required drive and electronics in aperture control will be priced at a later date. A non-recurring charge of \$1500 shall be made for programming the emulation of systems other than the Mark Century 120.

Price for the controller systems after the first ten (10) will be negotiated at a later date, but shall not exceed \$19,750 each or the lowest price offered to others for substantially similar equipment, whichever is lower.

III. WARRANTY

MI warrants that the controller system provided shall be equal to or higher in reliability when compared to equivalent electronic equipment, when used in normal environment and in accordance with standard operating procedures and instructions provided with the controller system by MI. MI warrants that the controller system shall comply with the specification as set forth in paragraph VI (including attachments). MI warrants parts and labor for a period of one (1) year from date of installation at customer's facility, for all customers within the U. S., excluding Hawaii and Alaska. Such warranty is voided with respect to causes such as abnormal use, fire, flood or any other cause of failure not related to normal functional defects. Warranty shall be fulfilled by MI factory repairer or at MI's option, by replacement of a plug in defective subsystem, located by customer following maintenance procedures set forth by MI, provided said customer is able to do so.

IV. Emulator

The Contourama IV will emulate other standard NC systems to provide for full tape interchangeability. This will permit a drilling machine to operate with the same tape that was used for the photographic artwork generation. The Contourama IV, Model 300 system will emulate the GE Mark Century 120. Other controls can be emulated as an optional feature.

V. Optical Drafting Machine

The Contourama IV, Model 300 system will generate complex printed circuit board artwork in conjunction with an "optical stylus." The film is driven under this light source to trace the printed circuit pads and interconnections. Linear and circular contouring provides flexibility in programming complex printed circuit interconnections.

VI. Axes Controls

Three axes of control are provided, where two axes are controlled with electro-mechanical stepper motors and the third axis is controlled with a photo-optical device. Synchronism between all three axes is required, particularly for contouring operations.

This system will incrementally command synchronized motion for positioning and contouring operations, where linear and circular contouring capability is provided. The Contourama IV will directly interface with the machine by generating drives for the same stepper motors that are presently part of the machine.

The optical z axis is controlled by initiating exposures or enabling a light source. The Contourama IV will interface with this optical axis by generating a digital on-off signal for exposure or illumination. Precise exposure time periods can be generated under tape control with exposure resolution of 50 millionths of a second.

VII. Contouring

The contouring capability of the Contourama IV will permit any linear or circular line segment or arc segment to be generated under tape control. The tape format conforms to the EIA standards for contouring.

A step-and-repeat application will permit machine motion at any angle, rather than merely in the row or column directions.

A printed circuit (PC) drafting machine application will permit PC interconnections and pads to be generated with lines at any angle and with circular arcs. Operation can be commanded from either tape or manual inputs, at the user's option.

III.

- A. Meets FULL EIA standards
- B. Machine control
 - a) 2 electro-mechanical axes
 - b) 1 photo-optical axis
- C. Tape control
 - a) Linear contouring
 - b) Circular contouring
 - c) 3 Fixed Cycles for step and repeat operations
- D. Digital resolution - 0.0001 inches
- E. G and M commands-8
- F. Manual data input
- G. Mirror image capability
- H. NIXIE tube numeric display
 - a) Sequence number readout
 - b) Machine position readout
- I. Tape compatability with the G. E. Mark Century 120
- J. Machine interface compatible with existing electro-mechanical equipment on the P-25 photo-optical machine.
- K. Absolute position tape format.
- L. Automatic pin indexing for film set-up.
- M. Power input
 - 115 VAC \pm 10%
 - 50-60 Hz single phase
 - 3.5 amps nominal
- N. Dimensions
 - 19 inch standard rack
 - 10 inches deep
 - 18 inches high
- O. Weight 50 lbs. max.

VIII. Operator Panel

The operator panel contains all of the controls and displays necessary for standard system operation, together with special controls and displays for more sophisticated operations. The special features include:

- a) A keyboard input to permit the operator to manually control the system in lieu of tape controlled operation.
- b) A set of NIXIE readouts for various time-shared readout operations, including:
 - 1) Sequence number readout
 - 2) Axis position readout
- c) Mirror image capability.

The versatility of the keyboard input and NIXIE tube display will optimize the man/machine interface to yield greater system utility.

IX. Intensity Control

An intensity control feature will be provided that will generate a drive signal to illuminate the light source. The signal will be proportional to the machine velocity, with an accuracy of $\pm 10\%$. Other characteristics are 6 VAC peak and 10 watts maximum.

X. M Functions

The M functions, punched on the input tape to the EIA standards, will cause the Contourama IV to command the following operations:

- a) Chase down
- b) Chase release
- c) Timer start

Machine axes motion will be inhibited, as required, during the execution of these operations.

XI. Step Motor Drive

The step motor drive will provide for a maximum contouring rate of 2000 steps per second and rapid traverse rate of 8000 steps per second.

The digital control will assure step motor static repeatability of ± 1 step. It should be noted that machine characteristics; such as lead screw and table loading and hysteresis; may further degrade the overall system accuracy.

XII. Automatic Acceleration/Deceleration

The Automatic Acceleration/Deceleration tape command will be processed to insure that the acceleration/deceleration capability of the step motor is not exceeded.

XIII. Documentation

One set of manuals will be provided with each production system

delivered. These will consist of the Operation Manual and the Maintenance Manual.

XIV. Private Label

The Contourama IV production systems delivered under this contract will have a single supplier identification, which is "DS America, Inc."

XV. Automatic Aperture Control

An automatic aperture control will be provided as option, with price and delivery to be defined. Initial systems will not provide this feature.

The Contourama IV will drive a step motor to position the aperture to the position commanded by the tape.

XVI. System Block Diagram

The functional blocks associated with the P-25/Contourama system are illustrated in Figure 1. The system communication and interface is also presented.

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Costs of transportation of parts or systems in the fulfilling of said warranty shall be born by MI.

IV. ARBITRATION

Any dispute arising from this contract shall be arbitrated in Los Angeles, by the American Arbitration Association in accordance with the association rules, whose decision shall be mutually binding.

V. EQUIPMENT CONSTRUCTION AND DELIVERY

DS shall provide a Superstep DS P-25-A Step & Repeat Printer to the MI facility within 30 to 45 days of this date. This DS P-25-A shall be a completely operational system, including the Fanuc control and stepper motor. The DS P-25-A shall be used by MI for design evaluation and integration and shall be returned to DS in working and saleable order.

Approximately three (3) months after this contract commences, MI shall demonstrate the prototype controller system. Acceptance testing according to the procedure and specifications described herein and in paragraph VI (including attachments), shall be performed by both parties on this prototype system in conjunction with the DS P-25-A at the MI facility. Acceptance of the prototype performance levels shall define the acceptance level of the production systems. The prototype at the completion of all modifications shall operate on a commercial basis in accordance with all of the specifications set forth in paragraph VI and attached hereto and in the event that such is not the case DS shall have the option to terminate this Agreement without any further obligation to purchase additional machines.

The first production unit will be delivered and integrated into a P-25 at DS America's Los Angeles facility four (4) to six (6) months after the date of this agreement. This system will be used for familiarization and demonstration by DS and will be the first of the ten (10) systems DS is required to purchase.

The second production system shall be delivered and integrated within 30 days of the first system. No further deliveries shall be made until the first system has been at the DS America's facility for 60 days and the second system has been at a customer facility for 30 days or a maximum of 45 days after delivery to DS America, whichever is sooner. Thereafter, system deliveries shall be one (1) or two (2) per month, per DS America release, until the ten (10) systems have been delivered.

VI. SPECIFICATION

The controller systems built hereunder shall meet the EIA standards for numerical controllers as set forth in EIA standards RS-227, RS-244, RS-267, RS-273, RS-274-A, RS-281, including all revisions thereto, and shall have specifications equal to or better than the Mark Century 120 Model 2 numerical positioning controller system as set forth in General Electric manual GEK-9065D. The EIA standards shall take precedence in the definition of system operation. The G. E. Mark Century 120 Model 2 numerical positioning controller system operation shall define the operation of the controller system to be delivered hereunder within such EIA standards. The aforementioned standards and manual are incorporated herein by reference thereto. In addition to these standards and specifications operational requirements as defined by DS shall be complied with, by the delivered controller systems which special

requirements are set forth in Exhibit "A" attached hereto.

DATED July 30, 1969

MICROCOMPUTER, INC.

By Gilbert P. Hyatt

DS AMERICA, INC.

By Steven J. Holler

CONTROLLER SYSTEM

I. General Introduction

The Contourama IV is a NEW GENERATION numerical control system with a versatile computer to provide special features not available on contemporary NC systems. This control is all solid state and maximizes the use of integrated circuits to achieve a highly reliable, miniaturized system. The availability of the self-contained system computer reduces the level of operator capability and training requirements and simplifies the set-up operations.

The Contourama IV, Model 300 is an NC system developed for photo-optical machines. Many features are provided as standard that are not provided by other numerical control systems. These include:

- a) Photo-optical controls
- b) Emulating another NC system
- c) Step-and-repeat Fixed Cycles
- d) Automatic pin indexing

In addition, many features are offered that are only available as extra cost options on other products. These include:

- a) Linear and circular contouring
- b) Special motor drive electronics
- c) Manual data input
- d) Tape sequence number readouts
- e) Machine position readouts

The features provided in the Contourama IV, Model 300 are presented in Table I.

II. Step and Repeat Operation

The manufacture of printed circuits (PCs) is accomplished with photographic processes. It is necessary to precisely generate multiple exposures of the artwork on a single film for the photographic mask. The step-and-repeat machine must precisely position the film for each exposure, where the positioning and exposure functions are controlled by the Contourama IV. Special Fixed Cycles and Contouring capability is available to simplify the tape and enhance the system versatility and performance.

It has been indicated that greater manufacturing accuracy can be achieved for multilayer PC boards if the step-and-repeat machine and drilling machine use the same punched tape. Therefore, the Contourama IV will expose the mask for the PC component pads using a tape identical to that used by the machine that will drill component insertion holes in the pads. The Contourama IV, model 300 is implemented to emulate a standard drilling machine control.